Remarks

The following comments are provided in support of the claims presented. Applicants respectfully request reconsideration of the claims.

1. § 103 Rejections

A. Claims 1 and 4-7 have been rejected under 35 USC §103(a) as being obvious over Akatsu et al (US 6,281,084) in view of Smith et al (US 6,479,395) and Agnello (US 5,897,349).

Applicants have herein amended Claims 1 and 4 to recite that the metal layer is "an exposed metal layer including aluminum." This amendment clarifies that the aluminum must be exposed to the HF/H_2SO_4 etching solution and must be retained after such exposure. This requirement was implicit in Claim 1 before the present amendment, but now is made explicit in view of the prior art which does not teach or suggest exposure of a metal layer including aluminum to an etching solution comprising HF and H_2SO_4. Support for the amendments to Claims 1 and 4 can be found on page 2, lines 11-23, in Tables 2 and 3, and in Fig. 2.

Akatsu et al teach that the gate conductor layer 20 is not exposed to the HF/ sulfuric etchant in stating that: "A nitride prespacer 24 is formed surrounding the gate material layer and nitride layer 22." (col. 2, lines 54-56). Thus, the nitride layer 22 which overlies the gate conductor layer 20 and the nitride prespacer 24 on the sides of the gate conductor layer 20 prevent any exposure of the gate conductor layer 20 to the HF/sulfuric etchant in Akatsu et al. Akatsu et al also provide a barrier layer 30 of oxide or nitride over the device to further encapsulate the gate conductor layer 20 prior to etching away the doped glass outer spacer 38 (see col. 2, line 63 through col. 3, line 2). These layers 22, 24 and 30 are not etched by the HF/sulfuric etchant (i.e. the etchant is selective to nitride and oxide as stated in col. 3, lines 36-39) so that the layers 22, 24 and 30 protect the gate conductor layer 20 from being exposed to the HF/sulfuric etchant. The Office also recognizes that the gate conductor layer 20 in Akatsu et al is not exposed to the etching solution in stating on

page 4 of paper no. 20040720: "Akatsu teaches the gate conductor (20) was not etched during the step of removing the glass material (38) because it was not exposed to the etching solution (Fig 3-4)." Therefore, Applicants respectfully submit that it must be presumed that the gate conductor layer 20 would be etched by the HF/sulfuric etchant if the gate conductor layer 20 were exposed as required by amended Claim 1 or otherwise the layers 22, 24 and 30 would not be needed in Akatsu et al. Furthermore, if one skilled in the art were to substitute an aluminum layer as disclosed by Agnello for the gate conductor layer 20 in Akatsu et al and to expose the aluminum layer as required by amended Claim 1, there is nothing in the art of record that would teach or suggest that the aluminum layer would be retained after exposure to the HF/sulfuric etchant. Therefore, one skilled in the art would not be motivated to expose the aluminum layer to Applicants' recited etching solution, but to the contrary to encapsulate the aluminum layer within the layers 22, 24 and 30 as taught by Akatsu et al. The requirement to encapsulate the gate conductor layer in Akatsu et al in order to protect it from exposure to the HF/sulfuric etchant is evidence for the *prima facie* unobviousness of amended Claim 1 which recites that the metal layer including aluminum is exposed to the etching solution comprising HF and H_2SO_4. Additionally, in Agnello, the gate conductor 13, which can be aluminum, is added after any etching by immersion is completed so that the aluminum is not exposed to any etching solution. This provides further evidence for the *prima facie* unobviousness of amended Claim 1 which requires that the aluminum metal layer be exposed to the etching solution comprising HF and H_2SO_4. Therefore, Applicants respectfully submit that Claims 1 and 4-7 are allowable over the combination of Akatsu et al, Agnello and Smith et al.

The Office cites Akatsu et al for disclosing "a plurality of deposited and patterned layers of polysilicon (18)." Applicants respectfully traverse this statement by the Office and submit that this is not the case since Akatsu et al disclose only a single polysilicon layer 18 (see col. 2, lines 51-54 and figures 1-5). Nowhere does Akatsu et al disclose a plurality of layers of polysilicon as required by amended Claim 1. Therefore, Applicants respectfully submit that the Office has not made a

valid *prima facie* case of obviousness for the rejection of Claims 1 and 4-7 since these claims recite etching of a plurality of layers of polysilicon. Therefore Claims 1 and 4-7 are allowable.

There is nothing in the art of record that teaches or suggests to one skilled in the art that a device having an exposed metal layer including aluminum layer would survive being immersed in an etching solution comprising HF and H_2SO_4 as required by amended Claim 1. In Akatsu et al and Agnello, the gate conductors are protected from exposure to any etching solution by being encapsulated within protective layers in the case of Akatsu et al, and by being added after wet etching is completed in the case of Agnello. Smith et al does not teach or suggest anything of a metal layer including aluminum. Therefore, Applicants respectfully submit that there would be no reasonable expectation of success for one skilled in the art to form Applicants' invention as recited in amended Claim 1.

How would one skilled in the art know whether or not a metal layer including aluminum in a device would be retained and not chemically attacked by exposure to an etching solution comprising H_2SO_4 and HF as recited in amended Claim 1? The answer to this question cannot be found in the art of record, but only from Applicants' disclosure. Without any information in the art of record about whether or not aluminum would be attacked by exposure to an etching mixture comprising HF and H_2SO_4, Applicants respectfully submit that one skilled in the art would not be motivated to expose a metal layer including aluminum to such an etching solution since there would be no way to know whether or not the aluminum would be retained after exposure to this etching solution. Therefore, Applicants respectfully submit that the Office has not made a valid *prima facie* case of obviousness for the rejection of Claims 1 and 4-7 based on the art of record.

Applicants further submit that the motivation for combining Akatsu et al, Smith et al and Agnello "by using aluminum because equivalent and substitution of one for the other would produce an expected result" (page 4 of paper no. 20040720) is insufficient to form a valid *prima facie* case of obviousness since this motivation does

not address whether or not the exposed aluminum layer would be retained after etching with the mixture of HF and H_2SO_4 as required by amended Claim 1. If the aluminum gate conductor of Agnello were to be substituted into the device of Akatsu et al, the aluminum would be buried below protective layers (i.e. the layers 22, 24 and 30) and would never be exposed to the HF/H_2SO_4 as required by amended Claim 1. Thus the motivation provided by the Office is not sufficient to support a valid *prima facie* case of obviousness for amended Claim 1 so that amended Claim 1 and Claims 4-7 stemming therefrom are allowable.

B. Claims 8 and 9 have been rejected under 35 U.S.C. § 103(a) as being obvious in view of Akatsu et al, Smith et al and Agnello and further in view of Liaw et al.

As amended herein, Claim 1 is unobvious over the combination of Akatsu et al, Smith et al and Agnello for the reasons set forth above. Namely, Claim 1 has been amended to recite that the metal layer including aluminum is exposed to the etching solution comprising HF and H_2SO_4; whereas both Akatsu et al and Agnello teach against the exposure of a gate conductor to an etching solution. Therefore, since amended Claim 1 is allowable over the combination of Akatsu et al, Smith et al and Agnello, then Claims 8 and 9 which stem from amended Claim 1 are allowable over the combination of Akatsu et al, Smith et al, Agnello and Liaw et al.

Applicants respectfully submit that one skilled in the art would not be motivated to combine Smith et al and Liaw et al with Akatsu et al and Agnello since Akatsu et al and Agnello both teach that the gate conductor must be protected from etching either by encapsulating the gate conductor within nonetchable layers as taught by Akatsu et al, or by forming the gate conductor after wet etching is completed as taught by Agnello. Applicants further submit that the contrary teaching in Akatsu et al and Agnello for not exposing any metal layer including aluminum provides evidence for the *prima facie* unobviousness of Claims 8 and 9 so that these claims are allowable.

2. Extension of Time

Applicants hereby petition for a one-month extension of time to respond to the Office Action.

As payment for the one-month extension of time, the Office is hereby authorized to charge $110.00 to Sandia Corporation Deposit Account No. 19-0131.

If any additional fees are due, the Office is hereby authorized to charge such additional fees to Sandia Corporation Deposit Account No. 19-0131.

Conclusion

Applicants have responded to each and every rejection, and urge that the Application is in condition for allowance. A favorable reconsideration and entry of the amendments presented herein is earnestly solicited to place the application in condition for allowance.

Respectfully submitted,

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John P. Hohimer
Patent Attorney, Reg. No. 39,226
Sandia National Laboratories
Patent & Licensing Center, MS 0161
P. O. Box 5800
Albuquerque, New Mexico 87185-0161

Phone: (505) 844-4007
FAX: (505) 844-1418

CERTIFICATE OF MAILING

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is being deposited on the date shown below with the United States Postal Service in an envelope addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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